GOLDER

REPORT

Conceptual Water Management Plan for Humble Spring

Bayer Soda Springs Plant

Submitted to:

C/O P4 Production LLC

1853 Highway 34
Soda Springs, Idaho 83

Submitted by:

Golder Associates Inc.

18300 NE Union Hill Road, Suite 200 Redmond, Washington, USA 98052

+1 425 883-0777

913-1101-011.001.1H

September 20, 2018

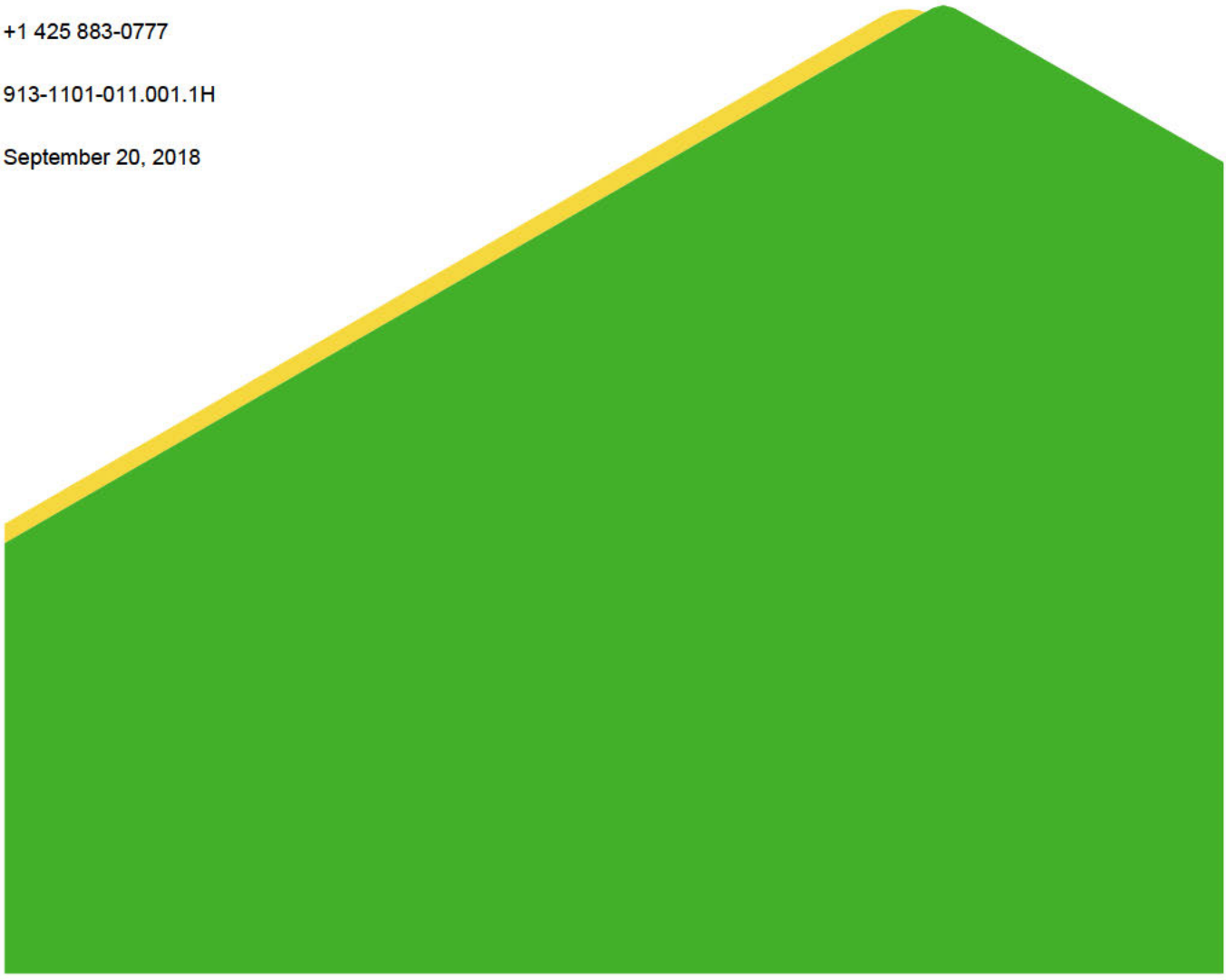


Table of Contents

1.0 INTRODUCTION

This report presents a conceptual water management plan for Humble Spring to capture and contain the spring flow to prevent offsite migration of the water and ingestion by wildlife or livestock when the spring is flowing.

1.1 Background

Humble Spring is located about 2,800 feet south of the South Plant Fenceline (Figure 1) on property owned by Bayer/P4 Production, LLC. Water was observed flowing from the spring in the Spring of 2017. Prior to Spring 2017, no water had been observed flowing from the spring since at least 1991. In early June 2017, ponded water was observed in the spring enclosure and in an adjacent treed area. There was no apparent flow. The spring was observed to be dry in mid-July 2017. On April 26, 2018, flow was observed from the spring enclosure. The flow was measured on May 4, 2018 and May 9, 2018 at a rate of 18.1 and 17.5 gallons per minute (gpm), respectively. On May 29, 2018, ponded water was observed in the enclosure, but there was no flow from the spring enclosure.

The spring consists of an approximate 50-foot by 35-foot open concrete enclosure (Figure A-1). It is uncertain when the spring was developed or if the base of the enclosure is lined with concrete or other material. The spring flows into the enclosure, filling the enclosure until the water level reaches an outlet at an elevation of 5,857.50 feet NAVD 88 based on an early June 2018 survey (Figure A-2). At the time of the survey, the water surface elevation in the spring enclosure was 5,857.33 feet NAVD 88. When the spring water level exceeds the outlet elevation, water overflows and enters a shallow depression with trees located about 75 feet south of the spring, where it infiltrates.

Based on geological logs from nearby monitoring wells (TW-59, TW-62, and TW-70) and the Lewis Well shown on Figure 1 (Appendix B), the general geology in the area of the spring consists of about 5 to 10 feet of silt and silty sand with weathered basalt fragments overlying weathered basalt and basalt. No water was observed in the unconsolidated materials during drilling in TW-59, TW-62, or TW-70.

Groundwater levels measured in the UBZ-2 basalt aquifer upgradient of Humble Spring at TW-62 (γ4) and TW-70 (γ3, Figure 1) range between 18.0 to 32.0 feet below ground surface (bgs), or an elevation of about 5,853.8 to 5,859.4 feet NAVD 88. TW-62 and TW-70 are about 650 feet northwest of Humble Spring. The depth to water in downgradient well TW-59 (γ4), located about 900 feet southwest of Humble Spring (Figure 1) ranges from about 17 to 21 feet bgs, or about elevation 5,838 to 5,842 feet (unknown datum). The Lewis Well is located about 500 feet southeast of Humble Spring and is open to both the γ3 and γ4 interflows. Based on limited measurements, the depth to water in the Lewis Well ranges from about 26 to 32 feet bgs and the groundwater elevation ranges from about 5,832.5 to 5,837.8 feet (unknown datum).

On April 26, 2017, the groundwater elevation in TW-62 was 5,859.3 feet (Figure C-1). This elevation was higher than the spring outlet elevation (5,857.5 feet), so it is assumed that the spring was likely flowing at this time. The groundwater elevation in TW-62 declined during the late spring and summer. Therefore, the spring likely stopped flowing during this period (it was observed to be dry in mid-July 2017).

In 2018, the maximum groundwater elevation in TW-62 was measured at 5,858.9 feet (end of April/early May). Observations showed the spring was flowing at about 17 to 18 gpm in early May consistent with the higher water level elevation in TW-62. The groundwater elevation in TW-62 declined during the late spring and early summer. On May 29, 2018, the groundwater elevation in TW-62 was 5,857.9 feet (Figure C-1); and observation of the spring on the same day showed that the spring was not flowing, and only ponded water was observed.

The data suggest that the Humble Spring represents shallow groundwater from the Upper Basalt Zone and when the groundwater level in TW-62 exceeds about 5,858 feet, groundwater surfaces at Humble Spring. Flow from the spring enclosure occurs when the water level in the enclosure exceeds the outlet elevation of 5,857.5 feet.

Water quality samples were collected from Humble Spring in May 2017, April 2018, and May 2018. The results of the water quality analyses are summarized in Table 1.

Table 1: Humble Spring Water Quality Data

Constituent	Units	June 2, 2017	Q	April 26, 2018	Q	May 31, 2018	Q
Alkalinity (total)	mg/L as $CaCO_3$	578		456		469	
Alkalinity (carbonate)	mg/L as $CaCO_3$	1	U	1	U	1	U
Alkalinity (bicarbonate)	mg/L as $CaCO_3$	578		456		469	
Ammonia	mg/L-N	0.069	J	0.03	U	0.03	U
Cadmium	mg/L	0.0009	U	0.0016	U	0.0016	U
Calcium	mg/L	143		129		128	
Chloride	mg/L	70.3	J	61.1		55.4	
Fluoride	mg/L	0.498	J-	0.71		0.818	
Hardness	mg/L as $CaCO_3$	747		653		658	
Magnesium	mg/L	94.9		80.1		82.0	
Manganese	mg/L	0.291		0.0258		0.150	
Molybdenum	mg/L	0.130		0.021		0.020	
Nitrate + Nitrite	mg/L-N	2.64		6.46		2.56	
Phosphorus(total)	mg/L	0.76		0.078		0.704	
Potassium	mg/L	11.0		9.02		10.1	
Selenium	mg/L	0.0381		0.0356		0.021	
Sodium	mg/L	44.4		40.2		41.3	
Sulfate	mg/L	246		207		178	
Total Dissolved Solids	mg/L	1,000		841		816	
Vanadium	mg/L	0.0028	U	0.0066		0.0042	J
Zinc	mg/L	0.009	J	0.010		0.013	

Notes:
mg/L: milligrams per liter
mg/L-N: milligrams per liter as nitrogen
mg/L as $CaCO_3$: milligrams per liter as calcium carbonate
Q: qualifier where:
U: not detected
J: estimated
J-: estimated with a low bias
2018 data have not been validated

As summarized on Table 1, water from Humble Spring meets the remediation goals for the constituents of concern as specified in the Record of Decision[1]. Selenium concentrations were measured at 0.021 to 0.0381 mg/L. The Humble Spring selenium concentration is similar to the 2017 and 2018 selenium concentrations at the Lewis Well of 0.0226 mg/L and 0.0089 mg/L, respectively. Selenium concentrations in upgradient well TW-62 in 2017 and 2018 were 0.147 mg/L and 0.127 mg/L, respectively.

2.0 CONCEPTUAL DESIGN

It is proposed to capture the Humble Spring flow prior to overflow from the spring enclosure. Phase I of the system will be to construct springbox improvements to capture the spring flow and convey the water to a bermed area located entirely on P4 property for surface infiltration. If needed, Phase II of the system will be to construct a below-grade infiltration system located downgradient of the bermed area. Phase II would be implemented if infiltration in the bermed area is not effective. Conceptual drawings of the Phase I infiltration system are presented in Appendix D.

2.1 Spring Enclosure

It is proposed to first clean out the spring enclosure by removing and disposing of vegetation from within the concrete walls. Once the spring enclosure is cleaned out, the concrete walls should be inspected and any cracks or holes be repaired using caulking or concrete grout. As part of the wall repair, two 4-inch diameter PVC pipes should be installed through the wall at the location of the current opening in the wall. One pipe should be placed below ground level and one above ground level. These pipes will serve as the outlet pipes of the spring. The pipes outlet through the wall should be sealed with watertight grout. The enclosure should also be inspected to determine the location(s) of spring flow into the enclosure.

Non-woven geotextile should be placed on top of the cleaned ground surface within the spring enclosure and then washed high-silica crushed rock placed over the top of the geotextile to the top of the concrete walls. The 4-inch diameter PVC outlet pipes should tee together inside the wall and extend into the gravel bed, and transition to perforated pipe (or slotted well screen) to collect the spring flow. The pipe should have at least 1-foot of gravel cover so there is no open standing water in the spring enclosure.

A standpipe should be installed within the spring enclosure near the outlet pipe to measure water levels in the spring enclosure and collect water quality samples.

The upper outlet pipe is for Phase I and will extend about 6 inches beyond the outside of wall and allow the spring to flow onto the ground surface and be directed to the bermed area. The lower outlet pipe will be reserved for Phase II (if required), and will be capped just outside the wall.

2.2 Infiltration Area

For the Phase I system, water from the Humble Spring will be allowed to flow to a bermed area on P4 property. An earthen berm will be constructed on P4 property to contain the water so it does not flow onto adjoining properties. Water will be allowed to infiltrate on P4 property. The system will be monitored to determine performance and the effectiveness of the surface berming and infiltration.

[1] United States Environmental Protection Agency. 1997. EPA Superfund Record of Decision, Monsanto Chemical Co. (Soda Springs Plant), EPA ID: IDD081830994, OU 01, Soda Springs, ID. April 30.

2.3 Maintenance and Monitoring

The performance of the Phase I infiltration system should be monitored after construction is complete. Monitoring should include:

- Measuring the water depth in standpipe within spring box.
- Record the flow from the outlet pipe using a bucket and stopwatch.
- Visual inspection of the berm and infiltration area to check for water presence/duration.

Monitoring will be limited to the months during the spring, when the spring is flowing and frequency of monitoring determined based on system performance. If no water is observed during peak flow time, then the monitoring may only need to be completed one or two times during the year. If water is observed in the standpipes installed in the spring box, then monthly to bi-weekly monitoring is recommended.

Maintenance should include:

- Inspect and removed of any vegetation that may grow within spring box.
- Repair or extending the berm as needed.

3.0 PHASE I CONSTRUCTION

The Phase I construction includes the improvements to the spring enclosure and construction of a berm to contain any water flowing from the spring on P4 property. An elevation survey should be performed in the area downgradient of the spring to select the general areas for the berm, and to provide information for siting an infiltration trench if needed for Phase II.

The berm should be approximately 1-foot high, with a base width of about 3 feet, the actual berm dimensions and placement will be determined in the field based on topography. Topsoil should be removed in the area of the berm and the subgrade compacted prior to placement of berm fill. The fill material used for the berm construction should be free from organic material, frozen ground, or cobbles larger than 4 inches in diameter. The fill can be sourced in the area directly adjacent to the berm, or sourced from clean, suitable materials that may be available locally. Stockpiled topsoil should then be placed to cover the berm.

Fencing should be placed around area where the water may pond to exclude wildlife.

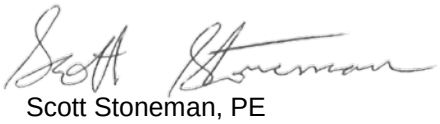
3.1 Phase II Construction

Phase II is dependent on the results of the Phase I work. If required, the details on Phase II construction including location and placement of an infiltration trench or other means to manage the water from the spring will be developed based on evaluation of the Phase I system performance.

Signature Page

Golder Associates Inc.

Michael Klisch
Senior Project Hydrogeologist



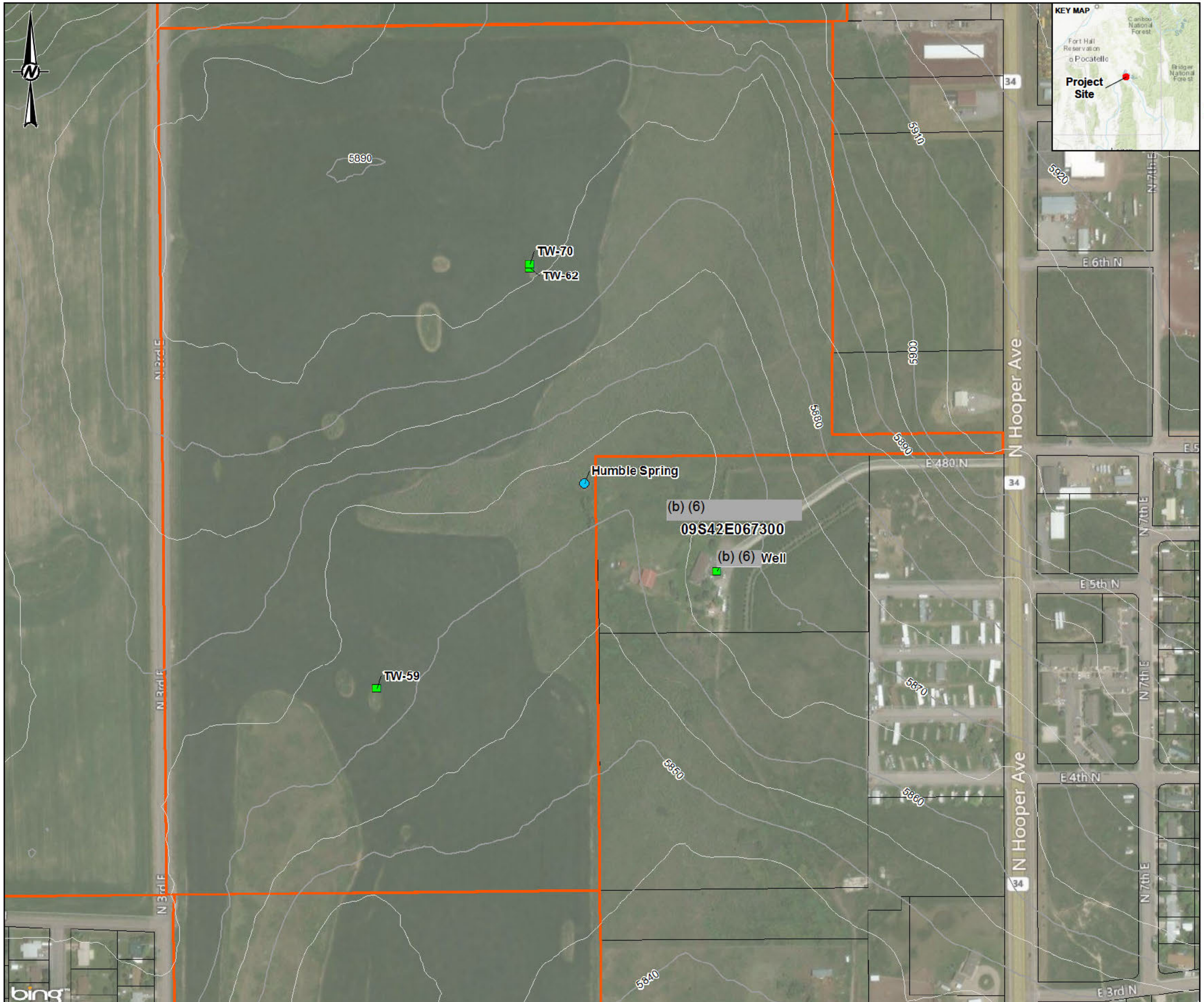
Scott Stoneman, PE
Senior Consultant

David Banton, LHG, RG
Principal Hydrogeologist

MK/SS/DB/ks

v:\projects_1991 projects\913-1101x011 monsanto 2017 hydrogeology\phase 001 sampling\humble spring\work plan revised\9131101011-rev0-humble spring work plan-09202018 docx

Figure



LEGEND

- SPRING
- WELL
- 10 FT CONTOUR
- 5 FT CONTOUR
- BAYER PARCEL
- PARCEL

0 300 600
1 N = 300 FT FEET

REFERENCE(S)
1. GOLDER (WELLS AND SPRINGS)
2. USGS (10M NED CONTOURS)
3. CAR BOU COUNTY (PARCELS)
4. COORD NATE SYSTEM: NAD 1983 STATE PLANE IDAHO EAST (FT)
5. SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, DELORME, TOMTOM, NTERMAP, NCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CH NA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
© 2018 MICROSOFT CORPORATION © 2018 DIGITALGLOBE ©CNES (2018) DISTRIBUTION AIRBUS DS © 2018 HERE

CL ENT
C/O P4 PRODUCTION LLC

PROJECT
HUMBLE SPRING WATER MANAGEMENT PLAN

TITLE
LOCATION OF HUMBLE SPRING

CONSULTANT
GOLDER

YYYY-MM-DD	2018-08-09
DESIGNED	BVJ/MK
PREPARED	BVJ
REVIEWED	MK
APPROVED	MK

PROJECT NO.	PHASE	REV.	FIGURE
9131101011	001.1G	0	1

APPENDIX A

Photographs

Figure A-1: Humble Spring May 30, 2018 showing standing water and spring enclosure

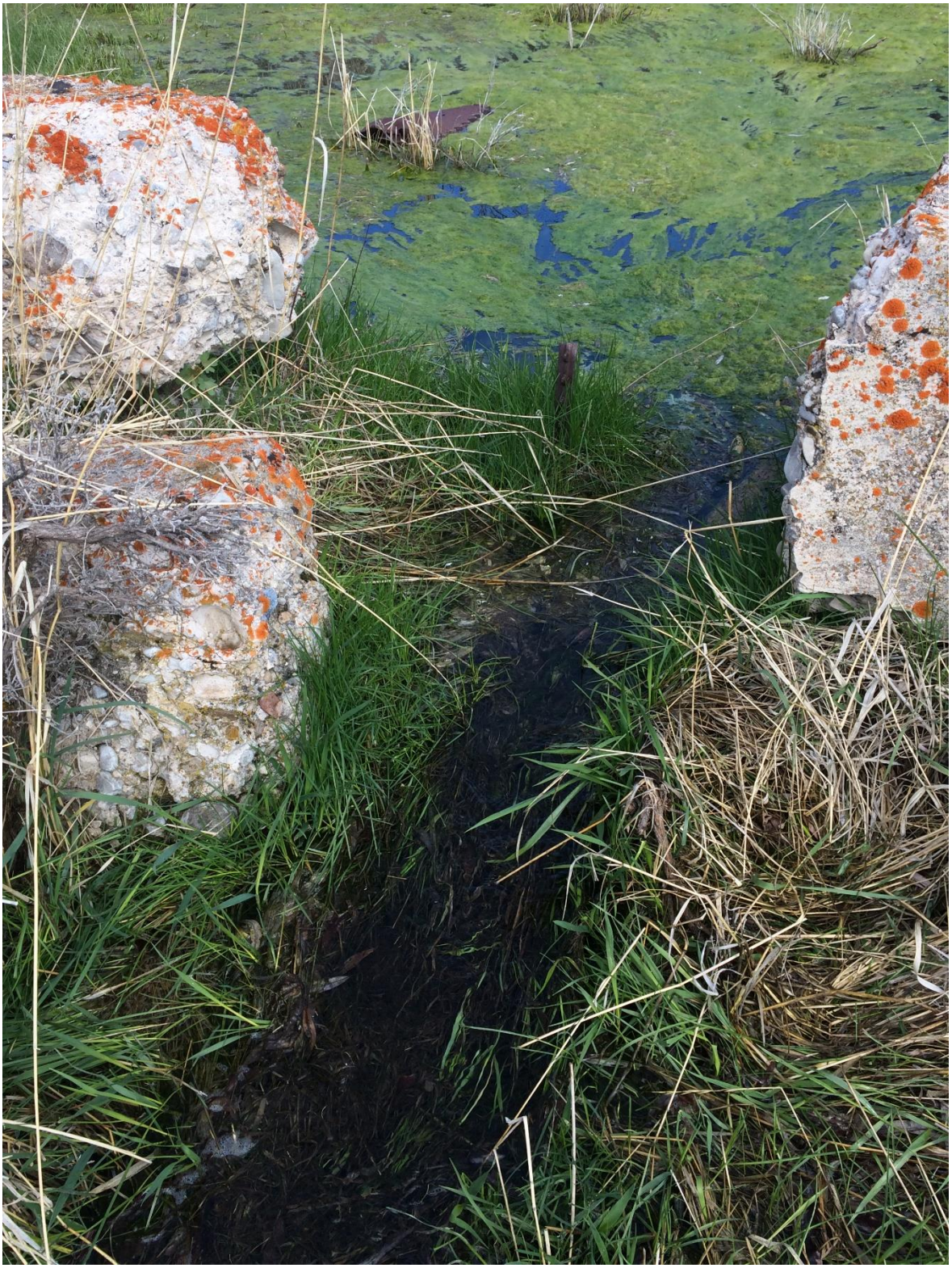


Figure A-2: Humble Spring outlet from spring enclosure with flow April 26, 2018

APPENDIX B

Geologic Logs

USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Administration

WELL DRILLER'S REPORT

RECEIVED
AUG 20 1974

State law requires that this report be filed with the Director, Department of Water Administration within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name (b) (6)

Address Soda Springs, Id. 83276

Owner's Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Other (specify type)

☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection

4. METHOD DRILLED

☐ Cable ☒ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 6¼" inches Total depth 105' feet

Casing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
.250 inches	8" I.D. inches	+ 1 feet	19 feet
.250 inches	7" I.D. inches	22 feet	35 feet
.258 inches	5" I.D. inches	32 feet	105 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was a packer or seal used? ☐ Yes ☒ No

Perforated? ☒ Yes ☐ No

How perforated? ☒ Factory ☒ Knife ☐ Torch

Size of perforation 3/16" inches by 3" inches

Number	From	To
240 perforations	85 feet	105 feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No

Manufacturer's name _____

Type _____ Model No. _____

Diameter ___ Slot size ___ Set from _____ feet to _____ feet

Diameter ___ Slot size ___ Set from _____ feet to _____ feet

Gravel packed? ☐ Yes ☒ No Size of gravel _____

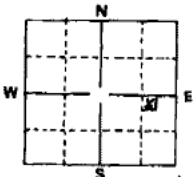
Placed from _____ feet to _____ feet

Surface seal depth 19' Material used in seal ☒ Cement grout ☐ Puddling clay ☐ Well cuttings

Sealing procedure used ☐ Slurry pit ☒ ~~Temporary~~ per surface casing ☒ Overbore to seal depth

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____

Lot No. _____ Block No. _____

County Caribou

NE¼ SE¼ Sec. 6, T. 9 ~~N~~/S, R. 42 E/~~W~~

7. WATER LEVEL

Department of Water Resources
Eastern District Office

Static water level 27' feet below land surface

Flowing? ☐ Yes ☒ No G.P.M. flow _____

Temperature 46° F. Quality Good

Artesian closed-in pressure _____ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☒ Other

Discharge G.P.M.	Draw Down	Hours Pumped
35		1

044885

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
12¼	0	9	overburden		X
"	9	19	Hard Massive Lava		X
7⅞	19	24	" "		X
"	24	34	Red Cinders	X	
"	34	35	Hard Massive Lava		X
6¼	35	41	" "		X
"	41	42	Broken Lava	X	
"	42	86	Hard Massive Lava		X
"	86	102	Creviced Lava	X	
"	102	105	Hard Lava		X

RECEIVED
AUG 22 1974
Department of Water Resources

10.

Work started 7-28-74 finished 8-15-74

11. DRILLERS CERTIFICATION

Firm Name Nelson Drilling Firm No. 215

Address Box 344 Soda Springs, Id. 83276 Date 8-15-74

Signed by (Firm Official) Ray Nelson

and

(Operator) _____

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE COPY TO THE DEPARTMENT

RECORD OF BOREHOLE TW-59

SHEET 1 of 2

PROJECT: Monsanto Soda Springs
PROJECT NUMBER: 913-1101.605
LOCATION: Monsanto Soda Springs

DRILLING METHOD: Air Rotary
DRILLING DATE: 6/27/07
DRILL RIG: Atlas-Copco TH-60

DATUM: MSL
AZIMUTH: N/A
COORDINATES: N: 4,723,978.73 E: 451,577 83

ELEVATION: 5855.89
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft / WATER CONTENT (PERCENT)	NOTES WATER LEVELS WELL GRAPHIC
0	Air Rotary w/ casing hammer	0.0 - 6 0 Light brownish gray (5YR6/1) to pale yellowish-brown (10YR6/2) Sandy, clayey S LT			5849.9							
5		6.0 - 12.0 Moderate brown (5YR4/4), highly weathered broken BASALT, trace clay			6.0 5843.9							
10		12.0 - 16.0 Dark gray (N3), vesicular, angular, strong BASALT			12 0	1	GRAB	08:50	08 50	0 5		0-0 5 feet is cement, below 0 5 feet cement is mixed with bentonite
15					5839.9							
		16.0 - 20.0 Dark gray (N3) sub-rounded to sub-angular, weak, highly weathered broken BASALT			16 0 5835.9							
20	Air Rotary	20.0 - 27.0 Dark gray (N3) moderately weathered, vesicular BASALT			20 0	2	GRAB	08:57	08 57	0 5		
25						3	GRAB	09:32 09:38-5	09 32 5	0 5		Bentonite seal
		27.0 - 28.0 Dark reddish brown (10R3/4) CINDERS mixed with dark gray (N3) broken BASALT			5828.9 27 0 5827.9							
30		28.0 - 33.0 Dark gray (N3) moderately weathered, vesicular BASALT			28 0	4	GRAB	09:45-5-10	5-10	0 5		
					5822.9							
35		33.0 - 37.0 Brownish black (5YR2/1) fractured BASALT, with fine sand and few gravels			33 0	5	GRAB	09:50-10-20	10-20	0 5		Colorado 10/20 silica sand Slotted PVC (0.020 inch openings)
					5818.9							
40		37.0 - 63.0 Dark gray (N3), sightly weathered, vesicular, dense/strong BASALT			37 0							
		Log continued on next page										

07/06/07

BOREHOLE RECORD GEOPHYSICS_BANTON.GPJ GLDR_WA.GDT 11/28/07

1 in to 5 ft
DRILLING CONTRACTOR: Boart Longyear
DRILLER: J. Arfman

LOGGED: P. Fahringer
CHECKED: M. Klisch
DATE: 9/19/2007

Golder Associates

RECORD OF BOREHOLE TW-59

SHEET 2 of 2

PROJECT: Monsanto Soda Springs
PROJECT NUMBER: 913-1101.605
LOCATION: Monsanto Soda Springs

DRILLING METHOD: Air Rotary
DRILLING DATE: 6/27/07
DRILL RIG: Atlas-Copco TH-60

DATUM: MSL
AZIMUTH: N/A
COORDINATES: N: 4,723,978.73 E: 451,577 83

ELEVATION: 5855.89
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft / WATER CONTENT (PERCENT)	NOTES WATER LEVELS WELL GRAPHIC
40	Air Rotary	37.0 - 63.0 Dark gray (N3), sightly weathered, vesicular, dense/strong BASALT *(Continued)*				6	GRAB	09:56-15-25	15-25	0 5		Cap
45						7	GRAB	10:07-10-20	10-20	0 5		
50						8	GRAB	10:14-10-20	10-20	0 5		Bentonite Grout
55						9	GRAB	10:18-15-25	15-25	0 5		
60						10	GRAB	10:21-10-20	10-20	0 5		
					5792.9							
		Boring completed at 63 0 ft.			63 0	11	GRAB	10:29-10-20	10-20	0 5		
65												
70												
75												
80												

PENETRATION RESISTANCE BLOWS / ft: 10 20 30 40
WATER CONTENT (PERCENT): w_p — w — w_l

1 in to 5 ft
DRILLING CONTRACTOR: Boart Longyear
DRILLER: J. Arfman

LOGGED: P. Fahringer
CHECKED: M. Klisch
DATE: 9/19/2007

Golder Associates

BOREHOLE RECORD GEOPHYSICS_BANTON.GPJ GLDR_WA.GDT 11/28/07

RECORD OF BOREHOLE TW-62

SHEET 1 of 2

PROJECT: Monsanto Soda Springs
PROJECT NUMBER: 913-1101.605
LOCATION: Monsanto Soda Springs

DRILLING METHOD: Air Rotary
DRILLING DATE: 7/7/07
DRILL RIG: Atlas-Copco TH-60

DATUM: MSL
AZIMUTH: N/A
COORDINATES: N: 4,724,367.56 E: 451,725.47

ELEVATION: 5878.67
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft / WATER CONTENT (PERCENT)	NOTES WATER LEVELS WELL GRAPHIC
0	Air Rotary w/ casing hammer	0.0 - 5.0 Loose, dark yellowish brown (10YR4/2) SILT, trace to little fine sand			5873.7							
5		5.0 - 10.0 Increasing BASALT fragments			5.0 5868.7	1	GRAB	10:24	10 24	0.5		
10		10.0 - 13.0 Grayish black (N2) to dark yellowish brown (10YR4/2), weathered, fine-grained BASALT with little silt and sand.			10.0 5865.7	2	GRAB	10:27	10 27	0.5		
		13.0 - 20.0 Grayish black (N2) fine-grained BASALT, moderately fractured			13.0							
15						3	GRAB	10:29	10 29	0.5		
20		20.0 - 27.5 Weathered, dark reddish brown (10R3/4) to blackish red (5R2/2) fine-grained BASALT, trace silt			5858.7 20.0	4	GRAB	10:31	10 31	0.5		Cement grout with bentonite Steel centralizer
25						5	GRAB	10:54	10 54	0.5		
	Air Rotary	27.5 - 48.0 Fresh to slightly weathered, unfractured moderate dark gray (N3) to grayish black (N2) BASALT			5851.2 27.5							
30						6	GRAB	11:12	11:12	0.5		
35						7	GRAB	11:20	11 20	0.5		
40		Log continued on next page										

1 in to 5 ft
DRILLING CONTRACTOR: Boart Longyear
DRILLER: J. Arfman

LOGGED: M. Klisch
CHECKED: J. Pietraszek
DATE: 9/19/2007

Golder Associates

BOREHOLE RECORD GEOPHYSICS_BANTON.GPJ GLDR_WA.GDT 11/28/07

RECORD OF BOREHOLE TW-62

SHEET 2 of 2

PROJECT: Monsanto Soda Springs
PROJECT NUMBER: 913-1101.605
LOCATION: Monsanto Soda Springs

DRILLING METHOD: Air Rotary
DRILLING DATE: 7/7/07
DRILL RIG: Atlas-Copco TH-60

DATUM: MSL
AZIMUTH: N/A
COORDINATES: N: 4,724,367.56 E: 451,725.47

ELEVATION: 5878.67
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) w_p — w — w_l	NOTES WATER LEVELS WELL GRAPHIC
40	Air Rotary	27.5 - 48.0 Fresh to slightly weathered, unfractured moderate dark gray (N3) to grayish black (N2) BASALT *(Continued)*				8	GRAB	11:30	11 30	0 5		
45						9	GRAB	11:35-5	5	0 5		Bentonite plug
					5830.7							
		48.0 - 52.0 Blackish red (5Y2/2) strongly fractured BASALT, trace Fe Ox on fractures, slightly weathered			48 0							
50						10	GRAB	11:50	11 50	0 5		Steel centralizer
					5826.7							
		52.0 - 59.0 Moderate brown (5YR3/4) to dark reddish brown (10R3/4) CINDERS and weathered BASALT			52 0							
55						11	GRAB	11:52-20-50	20-50	0 5		Colorado 10/20 silica sand Slotted PVC (0.020 inch openings)
					5819.7							
		59.0 - 66.0 Blackish red (5Y2/2) to grayish black (N2) BASALT, moderately fractured			59 0							
60						12	GRAB	11:58	11 58	0 5		Steel centralizer
												Bentonite chips
65												Caved material
					5812.7							
		Boring completed at 66 0 ft.			66 0							
70												
75												
80												

1 in to 5 ft
DRILLING CONTRACTOR: Boart Longyear
DRILLER: J. Arfman

LOGGED: M. Klisch
CHECKED: J. Pietraszek
DATE: 9/19/2007

Golder Associates

BOREHOLE RECORD GEOPHYSICS_BANTON.GPJ GLDR_WA.GDT 11/28/07

REPORT OF BOREHOLE: TW-70

CLIENT: Monsanto
PROJECT: We Insta at on
LOCATION: Soda Spr ngs, Idaho
PROJECT NO.: 913 1101 002

BOREHOLE LOCATION: Bare y f e d S of p ant
ELEVATION: 5879.77 ft
DATUM: Loca
INCLINATION: 90°

SHEET: 1 OF 3
DRILL RIG: REICH T 650W
LOGGED: D. Ho om DATE: 6/27/11
CHECKED: M. K sch DATE: 11/29/11

Drilling: METHOD	Drilling: SUPPORT	Drilling: DRILLING TIME	Drilling: WATER (bgs)	Drilling: DEPTH feet	Drilling: LAYER ELEVATION	Notes: Miscellaneous Observations	Material Description: SAMPLE TYPE	Material Description: GRAPHIC LOG	Material Description: USCS	Material Description: SOIL NAME density particle size color moisture minor components	FAILED WATER	MONITORING WELL DETAILS
12-inch diameter Air Rotary	10-inch steel casing to 21'	2min		0						Very loose dark yellow (10YR 4/2) silty fine SAND damp		TOC ELEVATION: 5882.28
						3-9' Driller notes clay and fine sand						
					5870 8							
					9 0					Moderately weathered olive black (5Y 2/1) finely crystalline very weak BASALT slightly vesicular fractured/broken		
		4min		10		Driller notes loose fractured basalt from 9'-13'						
		4min				Stop drilling at 20' on 6/23/11 Resumed 6/24/11						
		11min		20		No return						
						Driller notes fracture Bit is jumping						
					5855 8	1 5" chips at 23'						
					24 0					Moderately weathered olive black (5Y 2/1) to dark reddish brown (10YR 2/1) fractured BASALT very weak (reddish brown BASALT sligtly vesicular finely crystalline)	2gpm	
		13min				Stopped drilling at 25' on 6/24/11 Resumed 6/27/11						
		11min	▽									
					5850 8							
10-inch diameter Air Rotary Open hole	Water Quality 7/12/11 D W = 30 7' btoc pH = 5 86 S U Conductivity = 1768 uS/cm urbdidty = 9 31 N U DO = 3 06 mg/L emp = 10 1 °C @ ~16 gpm				29 0	Driller notes hard basalt Pull bit to set 10" casing Driller notes fracture at 31' Smooth drilling				Fresh olive black (5Y 2/1) very weak non-vesicular BASALT		
		7min		30								
		5min										
		5min										
		9min										
		6min										
		7min				Driller notes little water at 38 5'						
				40								

3/8-inch hydrated bentonite chips

4-inch SCH40 PVC riser

ENV RONMEN AL LOG W H WELL MONSAN O RSS GPJ GLDR RV GD 12/13/11

Report of borehole must be read in conjunction with accompanying notes and abbreviations

REPORT OF BOREHOLE: TW-70

CLIENT: Monsanto
PROJECT: We Insta at on
LOCATION: Soda Spr ngs, Idaho
PROJECT NO.: 913 1101 002

BOREHOLE LOCATION: Bare y f e d S of p ant
ELEVATION: 5879.77 ft
DATUM: Loca
INCLINATION: 90°

SHEET: 2 OF 3
DRILL RIG: REICH T 650W
LOGGED: D. Ho om DATE: 6/27/11
CHECKED: M. K sch DATE: 11/29/11

Drilling						Notes		Material Description			Monitoring Well Details
METHOD	SUPPORT	DRILLING RATE	WATER (bgs)	DEPTH feet	LAYER ELEVATION	Miscellaneous Observations	SAMPLE TYPE	GRAPHIC LOG	USCS	SOIL NAME density particle size color moisture minor components	ARTESIAN WATER
10-inch diameter Air Rotary Open hole		7min		40						Fresh olive black (5Y 2/1) very weak non-vesicular BASALT *(continued)*	1gpm
		8min									
		12min				1" chips					
		11min									
		7min		50							
					5827 8						
		1min			52 0					Slightly weathered olive black (5Y 2/1) to very dusky red (10YR 2/2) vaery weak vesicular fractured BASALT iron oxide	
		4min									
		4min				2" chips					
						Driller notes 8" drop at 59'					
		5min		60							10gpm
					5815 8						
					64 0	Driller notes firm basalt Smaller chips (1/2")				Slightly weathered to fresh olive black (5Y 2/1) very weak non-vesicular to slightly vesicular BASALT some iron oxide slightly fractured	15gpm
		5min			5813 8						
					66 0					Fresh olive black (5y 2/1) very weak finely crystalline BASALT non-vesicular	
						1/4" chips					
8-inch diameter Air Rotary Open hole to D		9min				Trip out					
				70							
		6min									
		5min				4" drop at 72' Driller indicates fractures at 72' and 73' No visible discharge color change					
		6min			5804 8						
		5min			75 0					Slightly weathered olive black (5Y 2/1) non-vesicular fractured BASALT iron oxide on fractures little cinders (scoria)	20gpm
				80	5799 8						

SS Centralizer

10/20 silica sand pack

ENV RONMEN AL LOG W H WELL MONSAN O RSS GPJ GLDR RV GD 12/13/11

REPORT OF BOREHOLE: TW-70

CLIENT: Monsanto
PROJECT: We Insta at on
LOCATION: Soda Spr ngs, Idaho
PROJECT NO.: 913 1101 002

BOREHOLE LOCATION: Bare y f e d S of p ant
ELEVATION: 5879.77 ft
DATUM: Loca
INCLINATION: 90°

SHEET: 3 OF 3
DRILL RIG: REICH T 650W
LOGGED: D. Ho om DATE: 6/27/11
CHECKED: M. K sch DATE: 11/29/11

Drilling						Notes		Material Description				
METHOD	SUPPORT	DRILLING TIME	WATER (bgs)	DEPTH feet	LAYER ELEVATION	Miscellaneous Observations	SAMPLE TYPE	GRAPHIC LOG	USCS	SOIL NAME density particle size color moisture minor components	ARTIFICIAL WATER	MONITORING WELL DETAILS
8-inch diameter Air Rotary Open hole to D		2min		80	80 0 5794 8	More rig chatter				Slightly to modeartely weathered olive black (5Y 2/1) to very dusky red (10YR 2/2) vesicular BASALT weak iron oxide on fractures (cinder)		4-inch SCH40 PVC 10 slotted screen
		5min			85 0 5790 8	Starting to firm up				Less vesicular more iron oxide trace olivine		SS Centralizer
		3min			89 0 5789 8					Fresh to slightly weathered olive black (5YR 2/1) non-vesicular very weak BASALT trace iron oxide		
				90	90 0					Boring completed at 90 ft bgs		

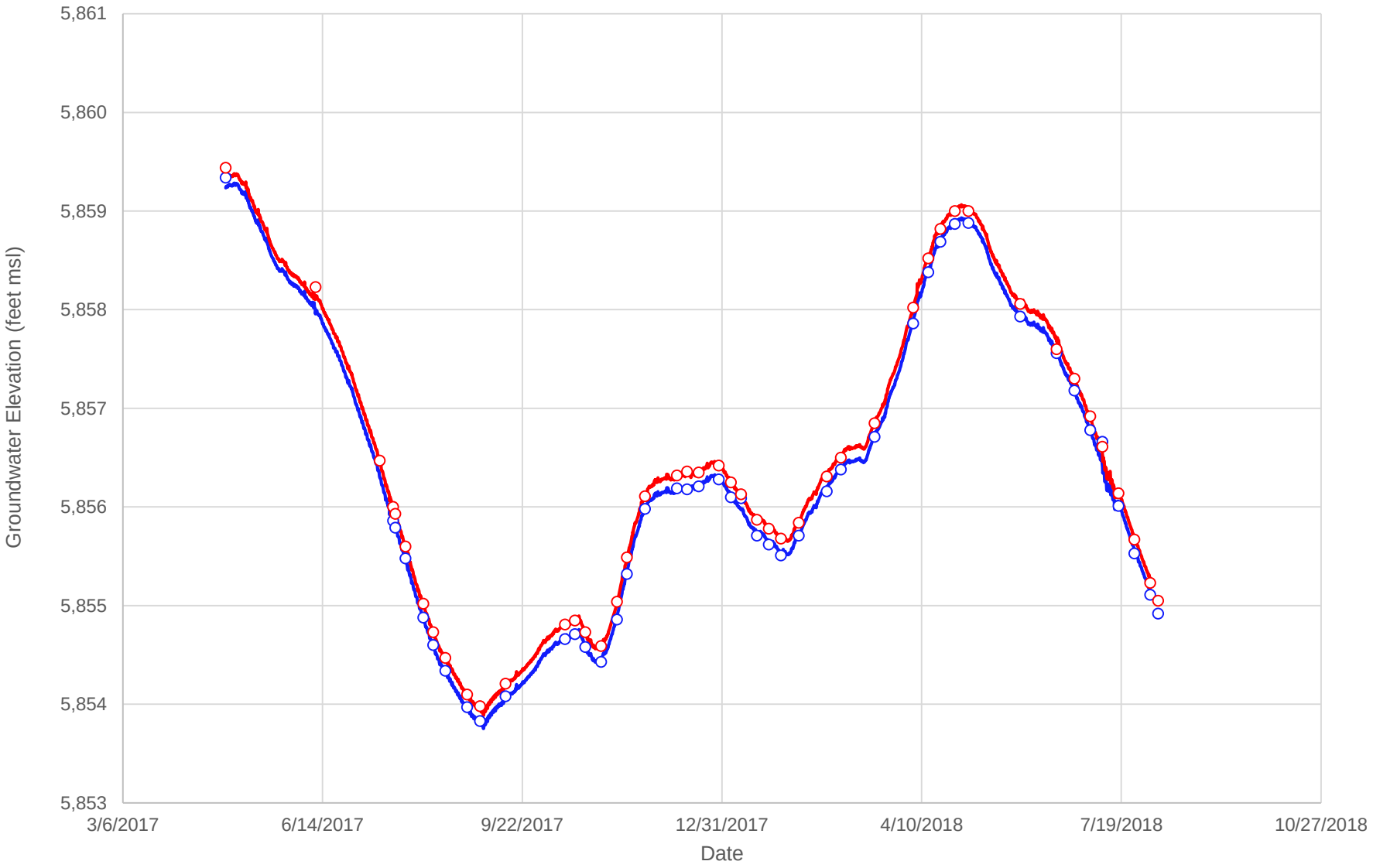
Report of borehole must be read in conjunction with accompanying notes and abbreviations

ENVIRONMENTAL LOG WITH WELL MONSANTO RSS.GPJ GLDR_RV.GDT 12/13/11

APPENDIX C

Groundwater Elevations in TW-62 and TW-70 UBZ-2

PATH V:\PROJECTS_1991 PROJECTS\913-1101X011 Monsanto 2017 Hydrogeology\Phase 009 Pumping Tests\2017 Hydrographs | FILE NAME TW-62 and TW-70.xlsx



LEGEND

TW-62 TW-70

CLIENT
C/O P4 PRODUCTION LLC

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-05-30
DESIGNED	---
PREPARED	MPK
REV EWED	DB
APPROVED	DB

PROJECT
HUMBLE SPRING
WATER MANAGEMENT PALN

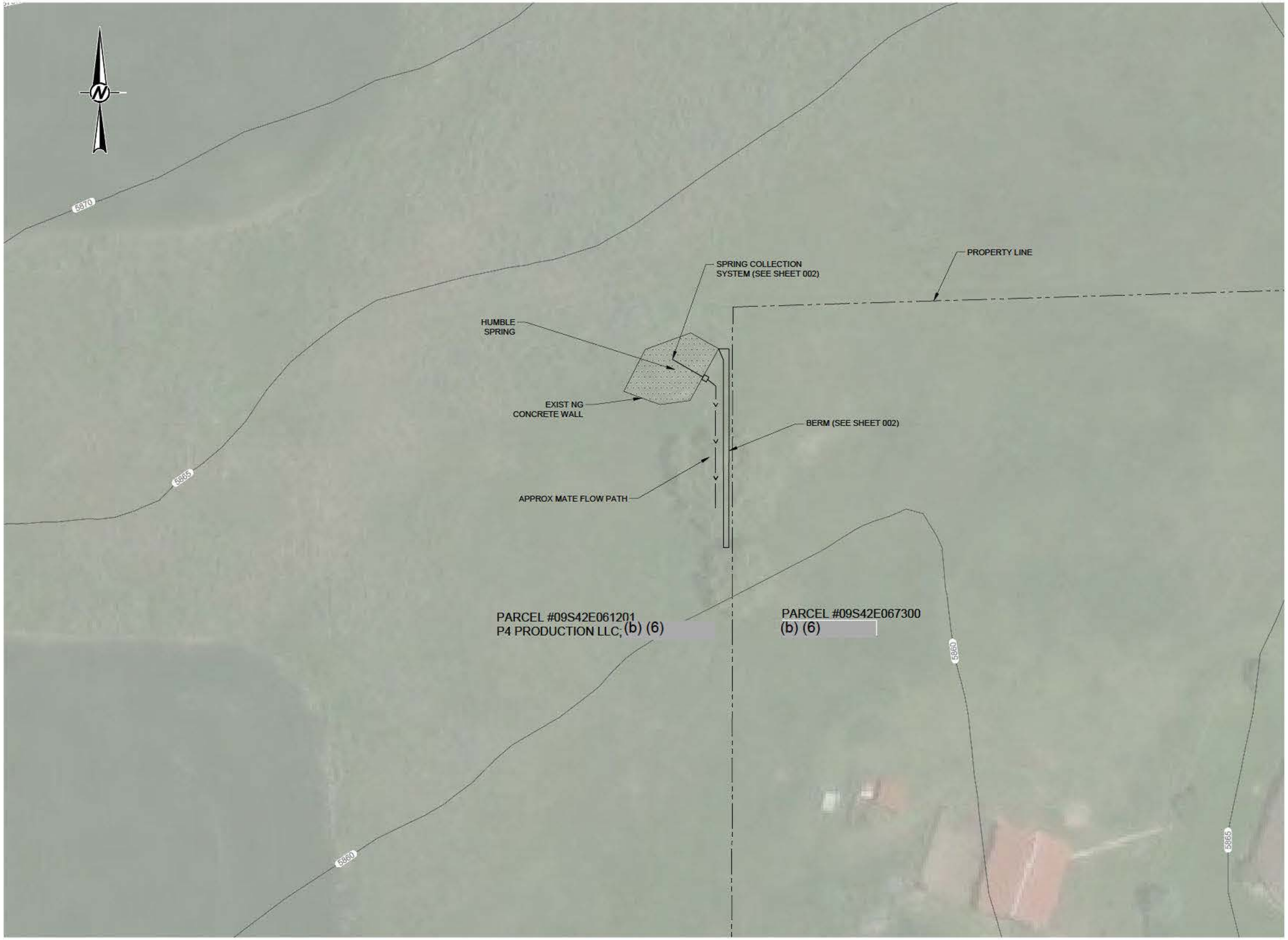
TITLE
GROUNDWATER ELEVATIONS IN TW-62 AND TW-70
UBZ-2

PROJECT NO.	CONTROL	REV.	FIGURE
913-1101-011		A	C-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
1 in
0

APPENDIX D

Conceptual Spring Capture and Infiltration System Drawings



NOTE(S)

REFERENCE(S)

1. PARCELS EST MATED FROM CAR BOU COUNTY PARCEL VIEWER.
2. CONTOURS FROM USGS NATIONAL ELEVATION DATASET.

0 50 100
1" = 50' FEET

REV.	YYYY-MM-DD	DESCR PTION	DESIGNED	PREPARED	REVIEWED	APPROVED
B	2018-09-13	ISSUED FOR REV EW	SS	JM	MK	DB

SEAL

CLIENT
C/O P4 PRODUCTION LLC

CONSULTANT

GOLDER

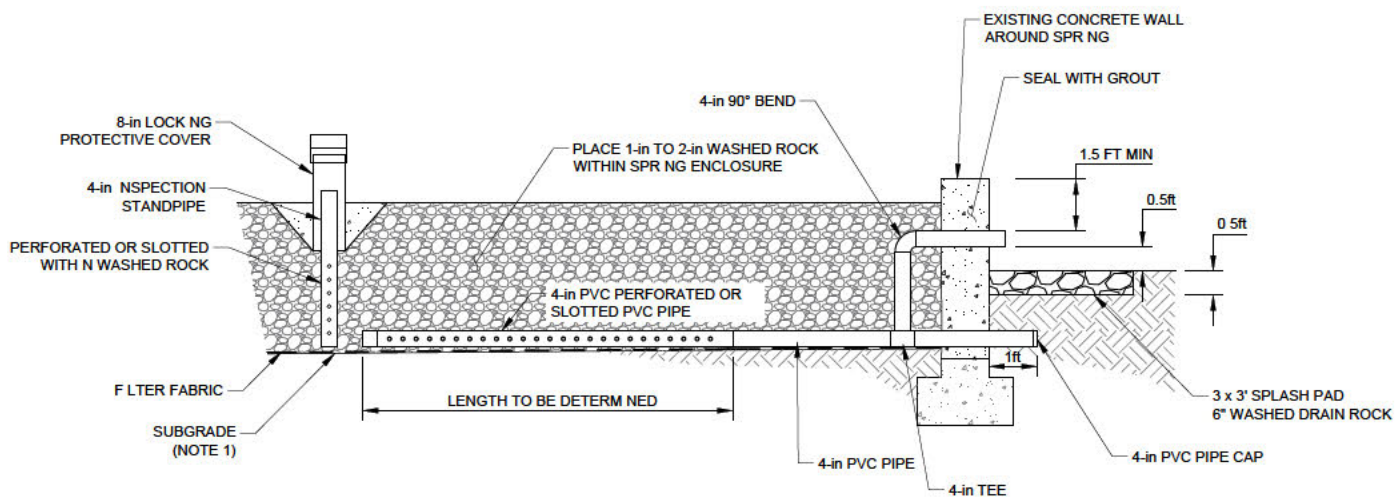
REDMOND
18300 NE UNION HILL ROAD, SUITE 200
REDMOND, WA 98052
U.S.A.
[+1] (425) 883-0777
www golder com

PROJECT
HUMBLE SPRING WATER MANAGEMENT PLAN
BAYER SODA SPRINGS PLANT

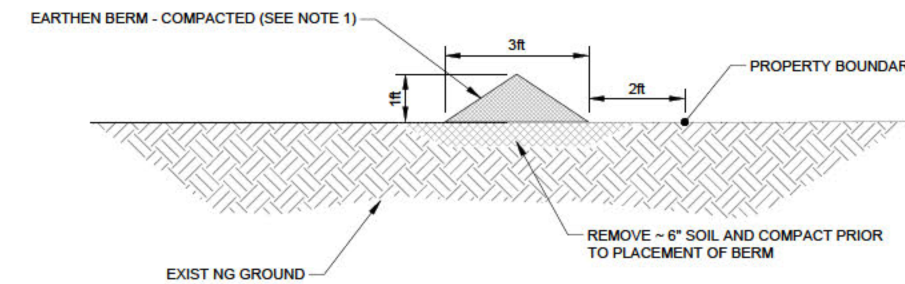
TITLE

PROJECT NO.	CONTROL	REV.		SHEET
93131101011		B	1 of 2	001

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D



SPRING COLLECTION SYSTEM SECTION



BERM SECTION

NOTE(S)

1. BERM TO PREVENT SPR NG WATER ENTERING (b) PROPERTY. LOCATION, LENGTH, AND HEIGHT OF BERM TO BE D RECTED BY ENG NEER DURING CONSTRUCTION.

0 2 4
1" = 2' FEET

REV.	YYYY-MM-DD	DESCR PTION	DESIGNED	PREPARED	REVIEWED	APPROVED
B	2018-09-13	ISSUED FOR REV EW	SS	JM	MK	DB

SEAL

CLIENT
C/O P4 PRODUCTION LLC

CONSULTANT
GOLDER

REDMOND
18300 NE UNION HILL ROAD, SUITE 200
REDMOND, WA 98052
U.S.A.
[+1] (425) 883-0777
www golder com

PROJECT
HUMBLE SPRING WATER MANAGEMENT PLAN
BAYER SODA SPRINGS PLANT

TITLE

PROJECT NO. 93131101011
CONTROL
REV. B
2 of 2
SHEET 002

golder.com